
2SK3070(L),2SK3070(S)

Silicon N Channel MOS FET
High Speed Power Switching

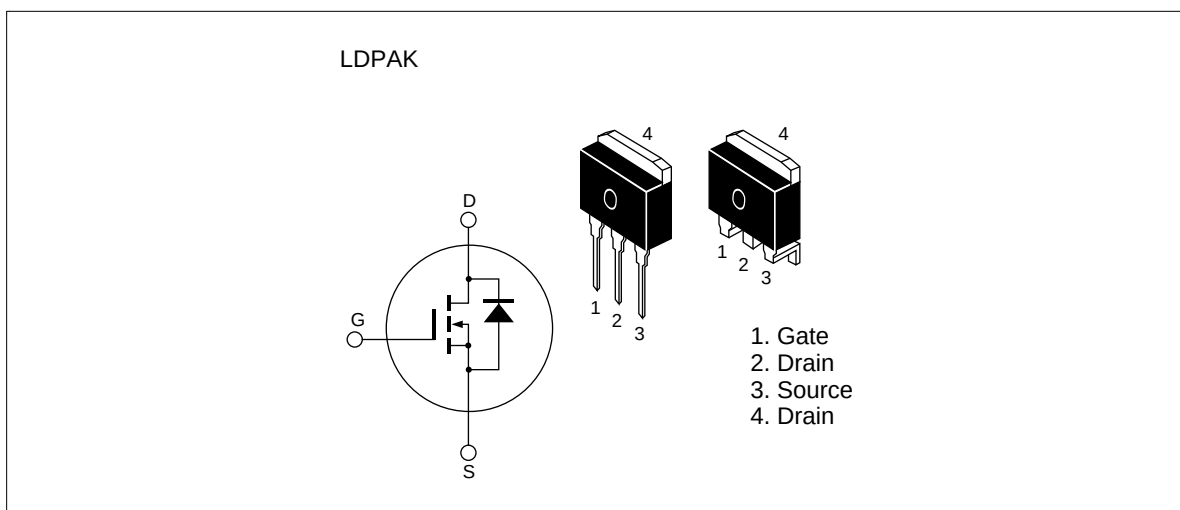
HITACHI

ADE-208-684G (Z)
8th. Edition
Feb. 1, 1999

Features

- Low on-resistance
 $R_{DS(on)} = 4.5 \text{ m}\Omega$ typ.
- Low drive current
- 4 V gate drive device can be driven from 5 V source

Outline



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Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	40	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	75	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	300	A
Body-drain diode reverse drain current	I_{DR}	75	A
Avalanche current	I_{AP} ^{Note3}	50	A
Avalanche energy	E_{AR} ^{Note3}	333	mJ
Channel dissipation	P_{ch} ^{Note2}	100	W
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	−55 to +150	°C

Note: 1. $PW \leq 10 \mu s$, duty cycle $\leq 1\%$
2. Value at $T_c = 25^\circ C$
3. Value at $T_{ch} = 25^\circ C$, $R_g \geq 50 \Omega$

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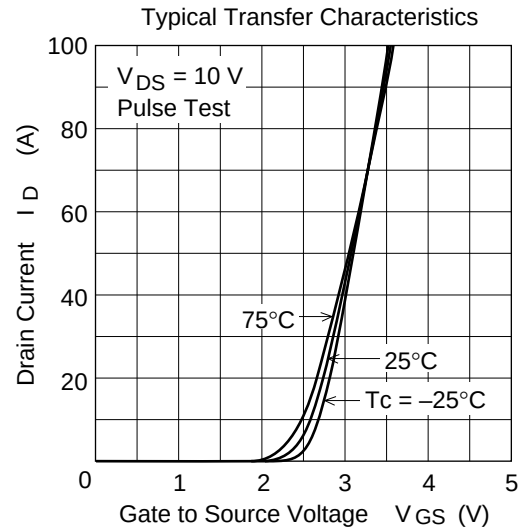
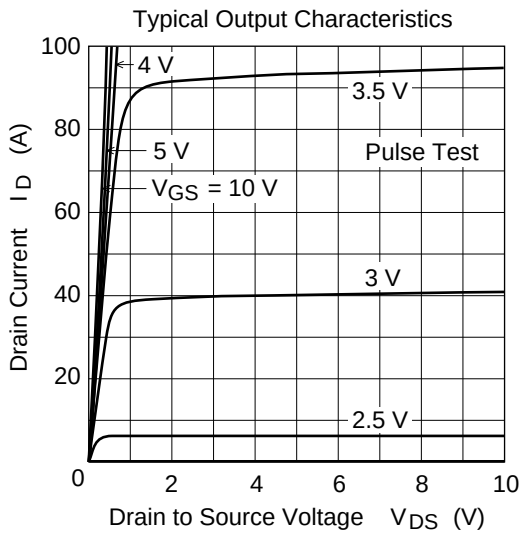
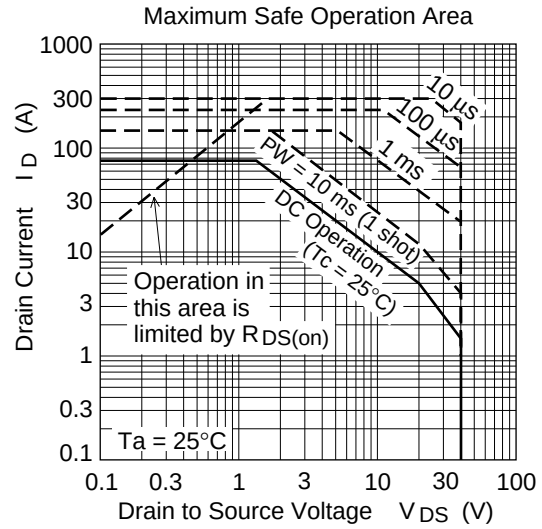
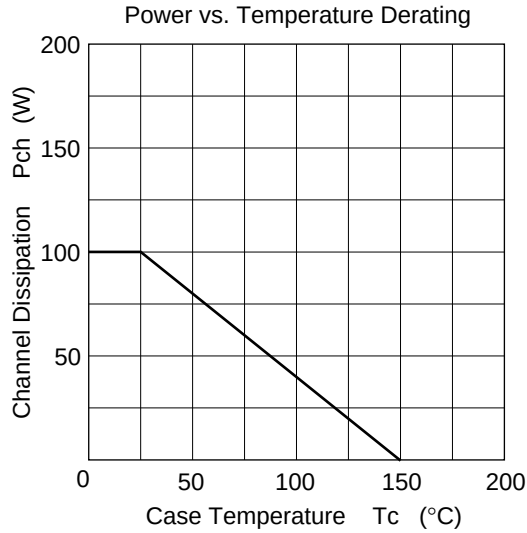
Electrical Characteristics (Ta = 25°C)

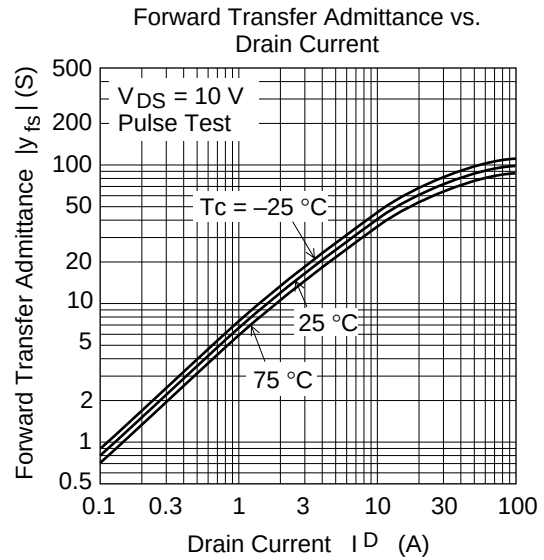
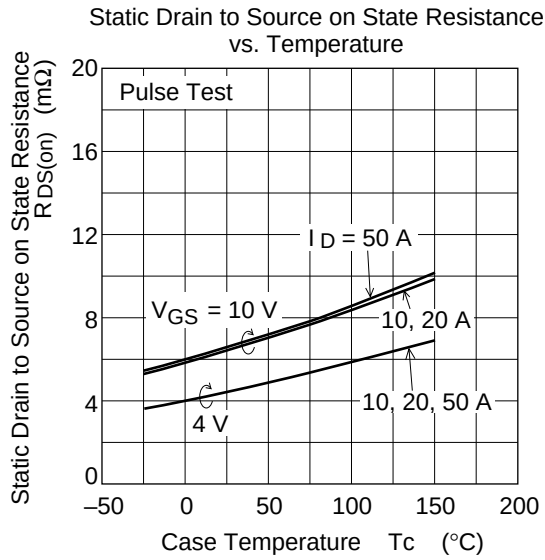
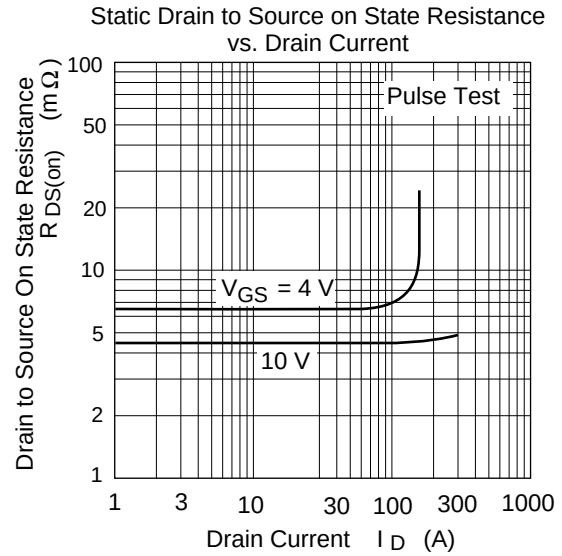
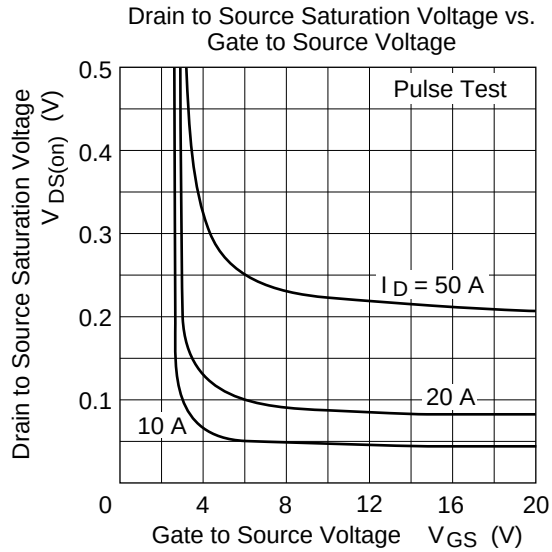
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	40	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	10	μA	$V_{DS} = 40 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	$I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$ ^{Note1}
Static drain to source on state resistance	$R_{DS(on)}$	—	4.5	5.8	$\text{m}\Omega$	$I_D = 40 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note1}
		—	6.5	10	$\text{m}\Omega$	$I_D = 40 \text{ A}$, $V_{GS} = 4 \text{ V}$ ^{Note1}
Forward transfer admittance	$ y_{fs} $	50	80	—	S	$I_D = 40 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note1}
Input capacitance	C_{iss}	—	6800	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	1300	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	380	—	pF	$f = 1 \text{ MHz}$
Total gate charge	Q_g	—	130	—	nc	$V_{DD} = 25 \text{ V}$
Gate to source charge	Q_{gs}	—	25	—	nc	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Q_{gd}	—	30	—	nc	$I_D = 75 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	60	—	ns	$V_{GS} = 10 \text{ V}$, $I_D = 40 \text{ A}$
Rise time	t_r	—	300	—	ns	$R_L = 0.75 \Omega$
Turn-off delay time	$t_{d(off)}$	—	550	—	ns	
Fall time	t_f	—	400	—	ns	
Body-drain diode forward voltage	V_{DF}	—	1.05	—	V	$I_F = 75 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	90	—	ns	$I_F = 75 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 50 \text{ A}/\mu\text{s}$

Note: 1. Pulse test

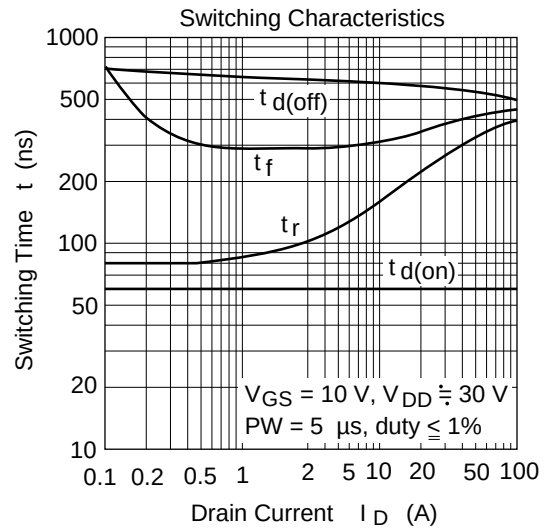
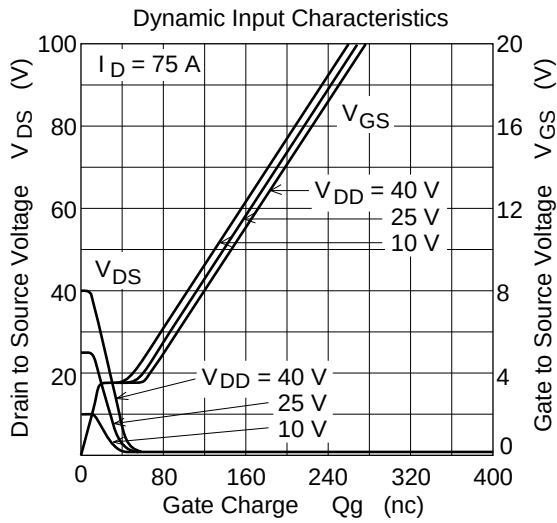
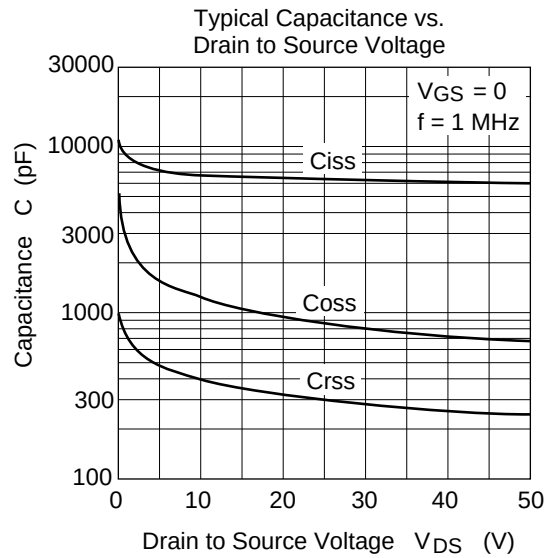
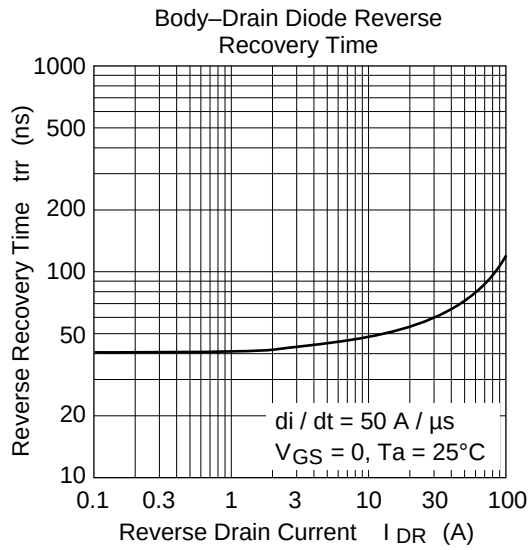
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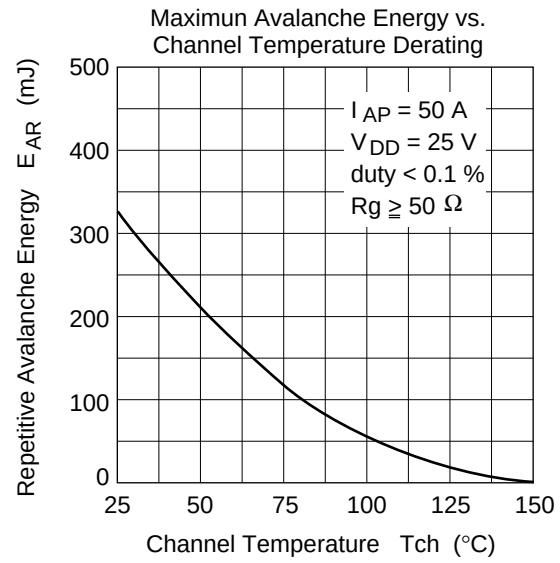
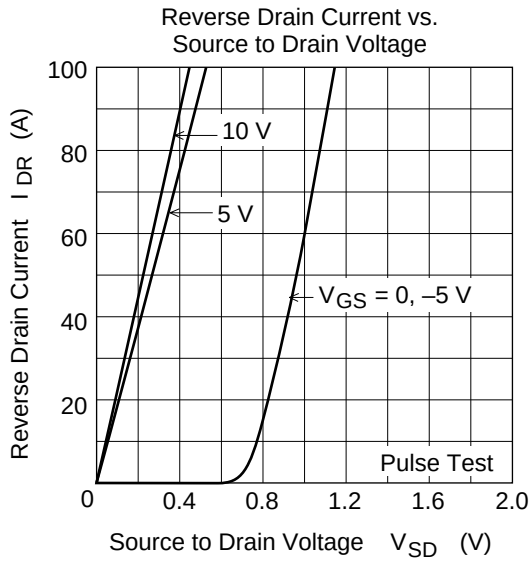
Main Characteristics



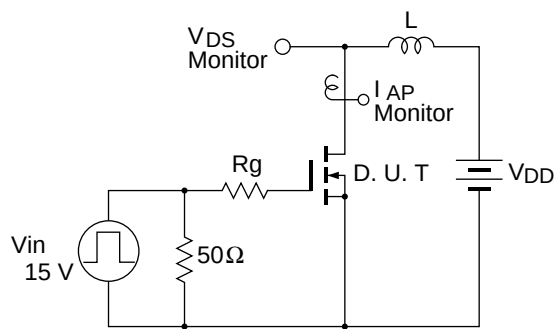


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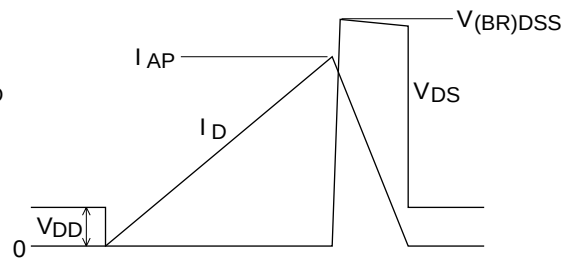


Avalanche Test Circuit

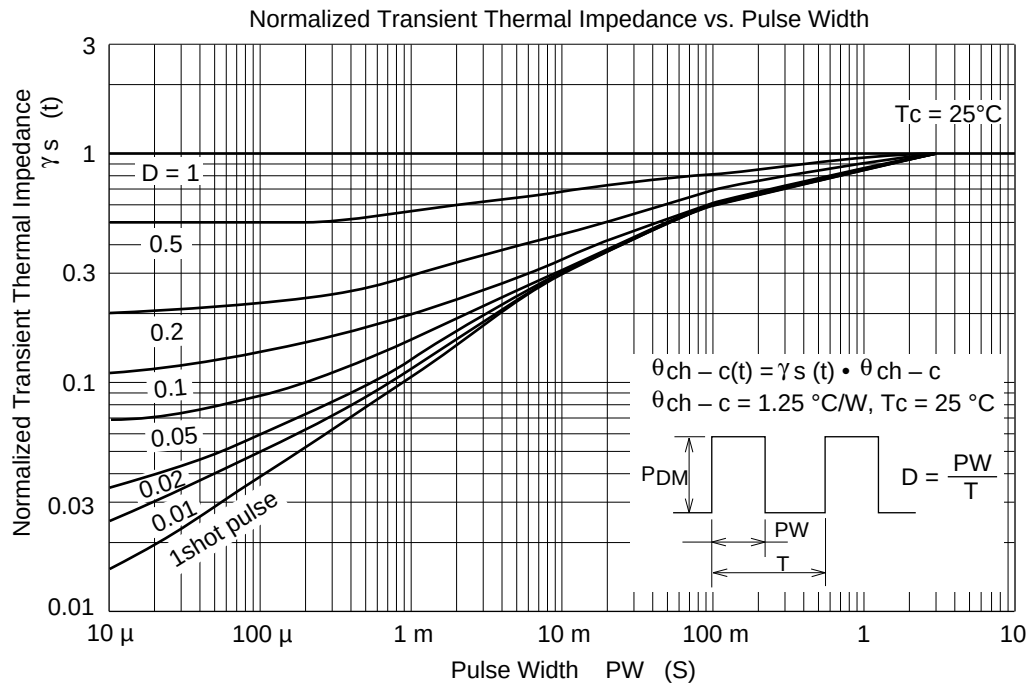


Avalanche Waveform

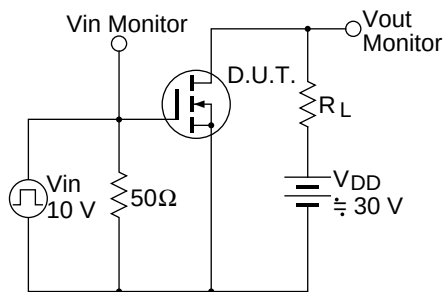
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



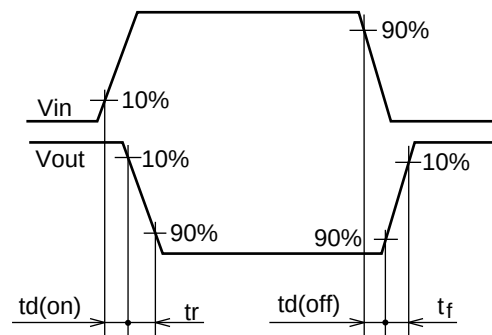
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Switching Time Test Circuit

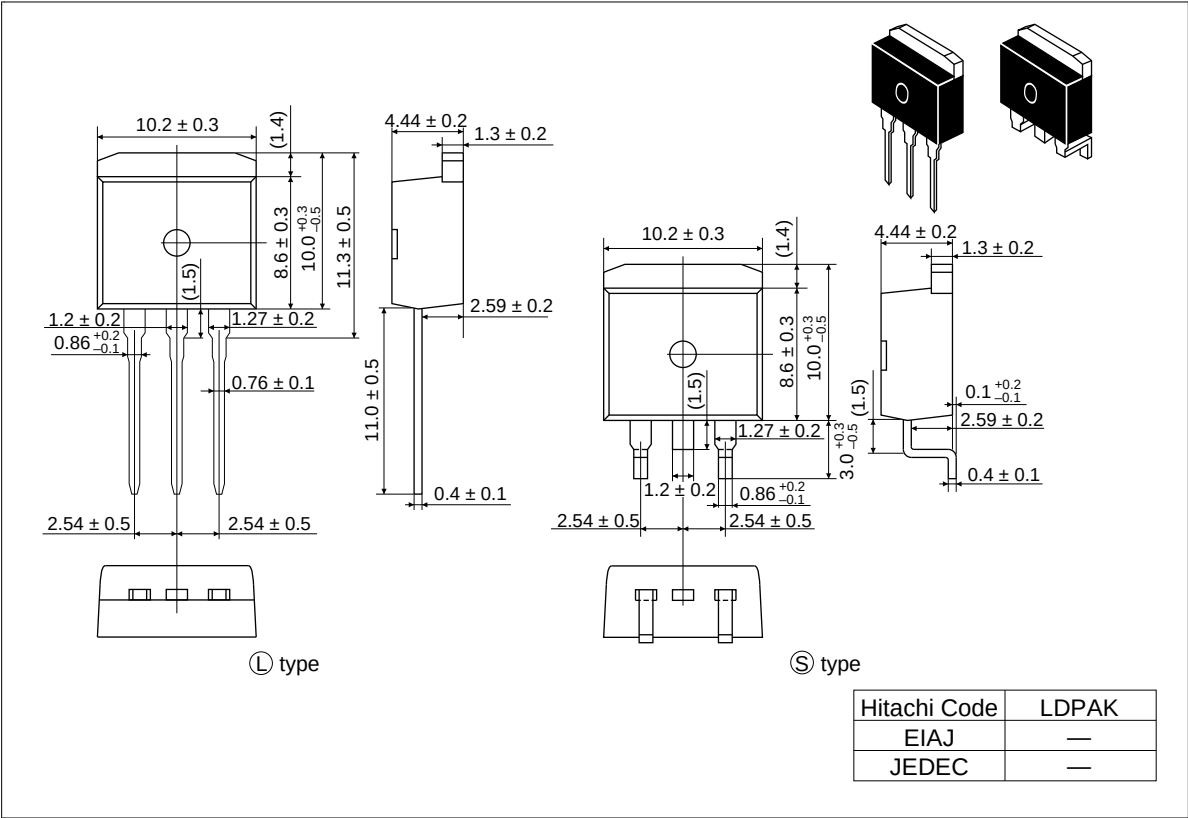


Waveform



2SK3070(L),2SK3070(S)

Package Dimensions (Unit: mm)



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